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The Somatic Engineer

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The Somatic Engineer. 2003. PJD discusses an usual claim, that engineers need to embody a value dimension, in which they are able to listen to customers, craft offers of value to them, and deliver. The discipline, Value Dynamics, cannot be taught by training the mind. It is taught through immersion, practice, and coaching. Engineers who teach Value Dynamics must already

Articles

THE SOMATIC ENGINEER

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Engineers are widely seen as people of great technical prowess but who are difficult to get along with, aloof from their customers, and inclined to substitute technologies of personal interest for technologies that would bring value to their customers. This exacts a huge cost -- unreliable and undependable technology, waste in technology development, and a standoffish identity for all engineers. These problems would largely disappear if engineers were educated in *value dynamics* -- the value-generating and value-delivery skills that are the foundation of leadership. The value skills cannot be learned from a book. They are most effectively learned through coached somatic practice.

I came to this conclusion by a roundabout route inspired by seemingly mundane but nonetheless important concerns of my computer science and engineering students. My students often seek help in their professional lives outside their courses. The most common complaints, especially among students holding down part- or full-time jobs, are that they feel overwhelmed, unable to fulfill all their commitments, and severely stressed in work, family, and health. Those who have been out in the field for a few years voice additional complaints. Some have great ideas but cannot get them across. Some are passed over for promotions or turned down for new jobs. Some can't believe that some customers would rather use a product inferior to theirs. Some are infuriated by the shameful way companies treat them in the name of "better customer service through information technology." Some find "genuine professionals," who take care of them expertly and unpretentiously, frustratingly rare in a world dense with professionals -- and they wonder if they are seen the same way. Many think their managers are jerks, notwithstanding the diplomas on their walls from well-known management schools. Many also think their teammates and their customers are jerks. They all think that something important was missing from their education.

All these challenges concern *value:* the value of one's ideas, the value of professional identity, the value of results delivered on time, the value of a company's customers, the value of working relationships. My students think their education made them great technicians but did not teach them to be value-delivering professionals.

Individual coaching is one approach to help these students. Another approach -- of potentially high leverage -- is to provide value training within an engineering curriculum. Until recently I did not think it was the business of engineering schools to do this. I changed my mind when I realized that breakdowns around software quality, software safety, and software development are taking a costly toll on society and the engineering

professions.

Beginning in the early 1990s, I developed courses in value training for engineers. I soon discovered that somatic learning is the key to success. This means that the training must encompass the whole body, including energy, emotions, moods, experience, cultural history, habits, tendencies, and practices. The skills and practices of value-production are not conceptual. They involve listening, relating interpersonally, acting decisively, and adding value. Following are some of my experiences with value training and their implications for teaching engineering.

Sense 21

At George Mason University I called my course Sense 21, short for "Designing a New Engineering Common Sense for the 21st Century." In my first offering (1993), I taught engineering students foundational principles of action in language I had learned from Dr Fernando Flores. I promised to show them how to be "observers of the observers" they are. I taught them that their life stories (autobiographies) revealed how they were shaped and how they observed the world. I taught them the importance of speech acts such as assertions, assessments, declarations, requests, and promises, and how those speech acts alter their worlds. I showed them that habituated tendencies in their bodies often prevented them from being effective with these acts -- for example, when they tensed up during a negotiation, held back on an important request, or were wishy-washy about a critical deadline. I taught them new interpretations of learning, education, career, work, and innovation. I taught that they have many changing roles as customers and performers. I taught them that their ability to inspire trust depended on managing their commitments well. I taught them how to listen to people not just as individuals but also as members of communities. I taught them how to design engineering systems that would be welcomed as innovations in their communities.

It was a big surprise for me early in my teaching of Sense 21 that, while the students eagerly embraced Dr Flores's ideas, they were unable to *perform* them effectively. No amount of talk and careful explanation helped them perform better. So I had to learn coaching. I created practices that revealed their performance-blocking habituated tendencies, which I then called "thrown-ness," and I created practices that taught them effective performance. I was constantly helping students overcome their "blindness" -- showing them what I could see about them but they could not see. Let me share three cases of how this worked.

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Jenny. I introduced the class to the notion of making a grounded assessment, a claim for which the speaker has provided a set of supporting assertions. Employers won't hire you and people won't follow you if all you can offer is ungrounded assessments. To practice grounding an assessment in a domain that mattered to them, I asked everyone to come to the next class prepared to present an overhead slide containing a grounded assessment of the claim, "I am competent at X," where X is any skill they choose. I asked them to think of this as a job interview, where the interviewer will ask them what they are good at and they need to respond with a grounded assessment.

Jenny, an extremely shy Asian student, was so quiet that the other members of the class knew nothing about her and paid her little heed. She came up after class and asked if she really had to do this. When she finishes her degree, she will return to her home country where her job already awaits her. I assured her that grounding assessments will be useful to her at home and asked her to do her best. She shrugged and said, "OK."

The next week, members of the class presented their claims of competence. After each, the class discussed whether they accepted the presenter's claim. "No, he hasn't sold me," was the typical comment, or, "those aren't assertions supporting the claim, they are just opinions." They found the judgments of their peers to be very humbling. All except Jenny.

Following her custom, Jenny spoke last. She claimed to be a competent schoolteacher. She listed teaching experiences she had in her home country and an award she had received for teaching. Every one of her grounding assertions was a solid, factual statement of accomplishment or experience. One by one, the jaws of her classmates dropped open in amazement. They said they had no idea that a gifted teacher was in their midst. They wanted to hear her stories about her experiences and what she learned about teaching. From that moment on they granted her great respect.

I used three somatic methods in these sessions. First, by putting them into a challenging situation that demands action, I revealed to my students that their habituated tendencies can overwhelm their best intentions. Although they all said they understood the concept of grounded assessments, in the heat of a public presentation their old habits of substituting opinions for facts took over. Second, I let the students demonstrate to each other, with my help as the coach-interpreter, the three most common ways of subverting a grounded assessment: giving opinions instead of assertions, joking around, and acting defensively. In their feedback, it was clear that the listeners felt that the speakers were trying to steer them toward the "right" conclusion and were afraid of rejection of their claim of competence. Third, I created a "smoking gun" where students were caught in the act of their incapacity to sell themselves to their peers or to an interviewer. At the same time I let Jenny teach them, through her own example, what a grounded assessment looks like and how powerful a leadership move a grounded assessment can be.

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Michael. In a moment of frustration, Michael sent me an email demanding to use a workstation in my lab to do a project in another class. I told him I could not do that because the workstations were reserved for the students working on research projects in my lab. This answer infuriated him. He told me that I was not exemplifying my own ideal of helping students get their work done. Fortuitously, in the previous class I had discussed seduction and listening for concerns. I asked Michael if he would agree to a coaching session in class to help him get to the bottom of why he was being ineffective in seducing me to his request. He agreed. In class, I explained to the others Michael and I were going to have a coaching session to demonstrate what I mean by seduction and listening for concerns. I asked Michael to read his email aloud and then repeat his request. Michael did so enthusiastically and quickly fell into the confrontational mood of his email. He tried half a dozen different arguments on me, all variations on the theme that I was acting unethically or irrationally in denying his request. None moved me; I declined all his requests. Soon the entire class was offering suggestions to Michael. Nothing worked. After about 10 minutes, Michael was sweaty and stiff, his breath shorts and labored. I could sense that the entire class shared Michael's mounting frustration. I let this go on until he could take it no longer. He hissed, "Are you just playing with me? Saying no just for spite? If not, what's wrong with my request? It's perfectly reasonable!" I said, "You have not addressed any of my concerns." With utter frustration, he threw his hands into the air, rolled his eyes to the heavens, and exclaimed, "But I don't even know what you are concerned about!" I smiled at him, leaned forward, and said, "Exactly."

Suddenly, Michael was convulsed with a Great Aha! He turned bright red and plunked down in his chair saying, "Geez, now I get what you mean by

seduction." The other members of the class looked startled and got it too. Then they excitedly urged him on: "Ask him what he is concerned about!" This he did. Soon he proposed to fashion his project to help contribute to the goals of the lab. I was seduced. We closed a deal.

I used two somatic methods in this session. First, I wanted to reveal to Michael (and his classmates) that he (and they) did not know how to listen for concerns. Michael was aware only of his own desires but not mine. He was not curious in the slightest about my own interests or the history of my lab. His habituated tendency had him so busy offering reasons and logic that he could not listen. Second, I wanted Michael (and his classmates) to directly experience the breakdown as a biological event -- physical signs such as sweating and short breath, emotional signs such as frustration, and mood signs such as resignation. After this session, I gave Michael a breathing practice to help him learn to be a better listener by watching his own energy, aliveness, and sensations as a prerequisite to becoming aware of these things in others; I also gave him a conversational practice of displaying a genuine curiosity about whom he was talking to.

* * *

David.

David had received a major promotion at work. He found himself in a much bigger world where he had to provide direction for many projects around the company. Now he had to rely on project managers to keep their promises and he could no longer fall back on his old way of jumping in to rescue a slipped deadline or failing project. But he kept locking horns with his new boss in disagreements over project management strategy. He feared that these disagreements could eventually lead to his demise. One day his boss told him that he was being condescending with another member of his group. This assessment so shocked him that he came to me for coaching.

I asked David to reenact the interaction with his group member so that I could see what he was doing to provoke his boss's assessment. It soon became apparent that when a skeptic challenged his authoritative statements, David tensed up, squinted, drew his head back, and looked down his nose at the skeptic. He provoked in me exactly the reaction that his boss reported. I told him this and showed him exactly how he was provoking the reaction -- squinting, tilting his head back, looking down his nose, and speaking with indignation at the perceived challenge to his authority. He was amazed that he was doing all this and wanted to learn new ways. He saw that this would not be easy because his old habit was so automatic that it was invisible to him.

I knew from previous conversations that David is very smart and had a tendency through all his working life to let things ride until the last minute when his innate skill and talents could "pull it out." Physically a big man, he had learned to use his size to intimidate, getting others to back off a criticism or to submit to his control. I told him that these tendencies left me with an assessment of him as a cowboy -- someone who is likely to shoot up the saloon to get his way. David's cowboy tendency was a context for his interactions with his new teammates. When they challenged him about this, he reacted with condescension. Therefore, I wanted to work on both these tendencies together.

The first thing I wanted David to learn was that his boss's assessment was not a statement of permanent truth about him. It was an assessment based on his own actions. He was fortunate in having a boss willing to share such assessments. I believed David could enlist his boss to help him see in real time exactly how he provoked the assessments he wanted to change. I asked him to write this down: "My boss says I am condescending. This is an

assessment. I do not accept this assessment as a permanent characterization of me. I can change it. I know that I am making moves that provoke him and other people to assess me as condescending. But I do not see what those moves are. Therefore I need to find a teacher who can see the moves and give me practices to retrain myself in different moves. My boss would be an excellent teacher." I asked him to read this aloud to himself once a day for the next week, reflect on it, and learn to say it on his own. The next time I saw him, he reported with obvious delight that his boss had agreed to be his teacher. The second thing I wanted David to learn was new practices to replace the ones judged by others as condescending. I gave him practices to train humility, wonder, and gratitude. These included imitating his young son's wondrous curiosity about life and people and concluding his day by speaking or writing his gratitude for all that had been given to him that day.

A few weeks later David told me his boss and his teammates now accept him as a full member of the team and that he welcomes his boss's feedback about his interactions with others.

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Throughout the course I use somatic practices to train components of value dynamics. A somatic practice typically consists of two or more people engaged in prescribed movements and conversations, followed by sharing of assessments about each other during the exercise. Many exercises are repeated with different partners. Examples are autobiography, centering, extending, blending, grounding assessments, requesting, declining, completing a workflow loop, adding value, and producing an innovation. More details are given in the appendix. The main purposes of each somatic practice are, first, to reveal to my students otherwise invisible aspects of themselves and their habituated tendencies and, second, to connect their inability to perform these actions with their inability to produce value for other people. The emphasis is always on *how* we do something because understanding *how* we do it gives us the opportunity to change.

I hope it is clear that these value skills cannot be taught from a book. They are not engineering "methods" or "processes." To drive this point home with my students, I repeatedly demonstrated to them that a clear conceptual explanation of a value skill was of almost no help to them in actually performing that skill competently.

In the end, value dynamics enabled my students to listen to customers, formulate offers that would bring value to them, manage their commitments, and deliver the value promised. When combined with their engineering, the value training enabled them to be designers of innovations, an important engineering skill. (In value dynamics, we define an innovation as a new practice that the group found more valuable than a previous practice.) Master software designer Bert Keely of Microsoft told me recently that the Sense 21 principles of design teach exactly the design practices he's used for years; the Sense 21 articulation helped increase his own awareness of how he designs.

The Sense 21 project has been a phenomenal success. Nearly all the students thought this was the most important and valuable course they had ever had, some even calling it "life altering". In 1993, the first graduates of the class formed an alumni group, which they called Sense 21, so that they could continue to meet and discuss their ongoing learning. The graduates of later Sense 21 classes joined. The group is still active today, ten years after it started. Sense 21 demonstrated that engineering combined with somatic practices that engage the whole self through physical, linguistic, and social awareness is more powerful -- and valuable -- than engineering alone.

A Personal Note

From the beginning, my heart has gone out to students who came to me for help with breakdowns they were experiencing in their personal and professional lives. Like Peanuts' Lucy, I sat behind my desk listening to my students and dispensing logical, rational, and intellectual advice. Because I had become an expert at containing my emotional rushes and reactions, I was almost completely unaware of my own body, my own sensations, and my own flows of energy. I could not empathize with other people's emotions because I did not sense them in myself. My logical advice probably rang hollow to many of my students because I did not address how they were feeling and experiencing. When I became a manager I was very competent at the management processes of stating our mission, defining our promises, recruiting good people, and getting things done on time. But when a disagreement came up in the group, or a confrontation, or anger, or even great joy, I would pull back from it. If someone directly confronted me, I would tense up and defend. Some of my teams became dysfunctional because I was unable to move with the emotions and moods of the group.

Dr Fernando Flores's language-action principles made the first real dent in this. He showed me that I was not a skilled performer of basic speech acts and that my fears of negative assessments and emotions kept me from successfully accomplishing the simplest of things such as making or declining a request. But I found it frustrating that my knowledge of such a powerful framework did not help me in challenging or charged situations, where it mattered the most.

The addition of Dr Richard Strozzi Heckler's somatic principles to the language-action framework made a dramatic difference for me and then for my students. I finally learned to sense my own body and to release the old contractions that contained my emotional energy. The more aware I became of my own sensations, the more aware I was able to be with others. I began to experience genuine connections with other people and to find that I could listen for what they cared about. Once aware of what they cared about, I more easily formulated actions that were of great value to them. I came to see that many of my colleagues in computer science and engineering were in the same boat I was. We have all been trained to deal with abstract concepts not with sensing, living bodies. Most of the breakdowns that our users experience with software and computers would be avoided if software engineers knew how to listen to their customers. I see that all I have learned in Sense 21 and from my teachers can now be synthesized as value dynamics and can help them. I am working with national and international curriculum groups toward adding a value dimension to engineering education.

For all Engineers

How might all computer scientists and engineers benefit from the lessons of Sense 21? Quality of professional interaction and design are core values of engineering. Sense 21 demonstrated that engineers trained in value skills will be superior professionals and superior designers.

In my field, commercial software is one of our most important products. Software is the only industry that refuses to warrant its work! Value-trained software engineers will be willing to stand behind their work.

In his 2001 book, *The Unfinished Revolution,* Michael Dertouzos documented 15 chronic design flaws that riddle most commercial software. These flaws infuriate users. Value-trained software engineers would not allow their software to contain these flaws.

One after the next, companies are turning to automated customer greeting systems, a practice that infuriates customers and yet is vigorously defended

by companies as "efficient." Value-trained information technologists (and businesspeople) would use technology to support, not replace, customer service agents.

These examples only scratch the surface. Would value-trained programmers develop and distribute spam, spambots, viruses, tool-kits for breaking into systems, "easter eggs" hidden in software, software that secretly sends personal data to hidden servers, or Web pages bloated with clever little pop-up ads? I think not.

In other words, the lack of value training in software engineering has a real and tangible cost to users and to businesses. It fosters distrust of software engineering professionals. Value dynamics is an antidote. It is a human face for technology. It is about the engineer's capacity to listen to others as dynamic beings who live with concerns. To do this, engineers must inhabit that human dimension themselves, living in their sensations, moods, aliveness, and energy. Their value-dynamics teachers must be skilled coaches in these arts. These changes will come eventually because the demand for the value-trained professional will grow and students will seek nothing less.

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